

## SEQUENCE LISTING

<110> Lex M. Cowser  
ISIS PHARMACEUTICALS, INC.

<120> ANTISENSE MODULATION OF G-ALPHA-S1 EXPRESSION

<130> RTSP-0061

<150> 09/344,914

<151> 1999-06-25

<160> 87

<210> 1

<211> 1516

<212> DNA

<213> Homo sapiens

<220>

<221> CDS

<222> (13)..(1155)

<400> 1

gccgccgccg cc atg ggc tgc ctc ggg aac agt aag acc gag gac cag 48

Met Gly Cys Leu Gly Asn Ser Lys Thr Glu Asp Gln  
1 5 10

cgc aac gag gag aag gcg cag cgt gag gcc aac aaa aag atc gag aag 96

Arg Asn Glu Glu Lys Ala Gln Arg Glu Ala Asn Lys Lys Ile Glu Lys  
15 20 25

cag ctg cag aag gac aag cag gtc tac cgg gcc acg cac cgc ctg ctg 144

Gln Leu Gln Lys Asp Lys Gln Val Tyr Arg Ala Thr His Arg Leu Leu  
30 35 40

ctg ctg ggt gct gga gaa tct ggt aaa agc acc att gtg aag cag atg 192

Leu Leu Gly Ala Gly Glu Ser Gly Lys Ser Thr Ile Val Lys Gln Met  
45 50 55 60

|   |     |
|---|-----|
| agg atc ctg cat gtt aat ggg ttt aat gga gac agt gag aag gca acc | 240 |
| Arg Ile Leu His Val Asn Gly Phe Asn Gly Asp Ser Glu Lys Ala Thr |     |
| 65 70 75  |     |
| aaa gtg cag gac atc aaa aac aac ctg aaa gag gcg att gaa acc att | 288 |
| Lys Val Gln Asp Ile Lys Asn Asn Leu Lys Glu Ala Ile Glu Thr Ile |     |
| 80 85 90  |     |
| gtg gcc gcc atg agc aac ctg gtg ccc ccc gtg gag ctg gcc aac ccc | 336 |
| Val Ala Ala Met Ser Asn Leu Val Pro Pro Val Glu Leu Ala Asn Pro |     |
| 95 100 105  |     |
| gag aac cag ttc aga gtg gac tac atc ctg agt gtg atg aac gtg cct | 384 |
| Glu Asn Gln Phe Arg Val Asp Tyr Ile Leu Ser Val Met Asn Val Pro |     |
| 110 115 120   |     |
| gac ttt gac ttc cct ccc gaa ttc tat gag cat gcc aag gct ctg tgg | 432 |
| Asp Phe Asp Phe Pro Pro Glu Phe Tyr Glu His Ala Lys Ala Leu Trp |     |
| 125 130 135 140   |     |
| gag gat gaa gga gtg cgt gcc tgc tac gaa cgc tcc aac gag tac cag | 480 |
| Glu Asp Glu Gly Val Arg Ala Cys Tyr Glu Arg Ser Asn Glu Tyr Gln |     |
| 145 150 155   |     |
| ctg att gac tgt gcc cag tac ttc ctg gac aag atc gac gtg atc aag | 528 |
| Leu Ile Asp Cys Ala Gln Tyr Phe Leu Asp Lys Ile Asp Val Ile Lys |     |
| 160 165 170   |     |
| cag gct gac tat gtg ccg agc gat cag gac ctg ctt cgc tgc cgt gtc | 576 |
| Gln Ala Asp Tyr Val Pro Ser Asp Gln Asp Leu Leu Arg Cys Arg Val |     |
| 175 180 185   |     |
| ctg act tct gga atc ttt gag acc aag ttc cag gtg gac aaa gtc aac | 624 |
| Leu Thr Ser Gly Ile Phe Glu Thr Lys Phe Gln Val Asp Lys Val Asn |     |
| 190 195 200   |     |
| ttc cac atg ttt gac gtg ggt ggc cag cgc gat gaa cgc cgc aag tgg | 672 |
| Phe His Met Phe Asp Val Gly Gly Gln Arg Asp Glu Arg Arg Lys Trp |     |
| 205 210 215 220   |     |
| atc cag tgc ttc aac gat gtg act gcc atc atc ttc gtg gtg gcc agc | 720 |
| Ile Gln Cys Phe Asn Asp Val Thr Ala Ile Ile Phe Val Val Ala Ser |     |

|   | 225 | 230 | 235 |      |
|---|-----|-----|-----|------|
| agc agc tac aac atg gtc atc cgg gag gac aac cag acc aac cgc ctg   |     |     |     | 768  |
| Ser Ser Tyr Asn Met Val Ile Arg Glu Asp Asn Gln Thr Asn Arg Leu   |     |     |     |      |
|   | 240 | 245 | 250 |      |
| cag gag gct ctg aac ctc ttc aag agc atc tgg aac aac aga tgg ctg   |     |     |     | 816  |
| Gln Glu Ala Leu Asn Leu Phe Lys Ser Ile Trp Asn Asn Arg Trp Leu   |     |     |     |      |
|   | 255 | 260 | 265 |      |
| cgc acc atc tct gtg atc ctg ttc ctc aac aag caa gat ctg ctc gct   |     |     |     | 864  |
| Arg Thr Ile Ser Val Ile Leu Phe Leu Asn Lys Gln Asp Leu Leu Ala   |     |     |     |      |
|   | 270 | 275 | 280 |      |
| gag aaa gtc ctt gct ggg aaa tcg aag att gag gac tac ttt cca gaa   |     |     |     | 912  |
| Glu Lys Val Leu Ala Gly Lys Ser Lys Ile Glu Asp Tyr Phe Pro Glu   |     |     |     |      |
|   | 285 | 290 | 295 | 300  |
| ttt gct cgc tac act act cct gag gat gct act ccc gag ccc gga gag   |     |     |     | 960  |
| Phe Ala Arg Tyr Thr Thr Pro Glu Asp Ala Thr Pro Glu Pro Gly Glu   |     |     |     |      |
|   | 305 | 310 | 315 |      |
| gac cca cgc gtg acc cgg gcc aag tac ttc att cga gat gag ttt ctg   |     |     |     | 1008 |
| Asp Pro Arg Val Thr Arg Ala Lys Tyr Phe Ile Arg Asp Glu Phe Leu   |     |     |     |      |
|   | 320 | 325 | 330 |      |
| agg atc agc act gcc agt gga gat ggg cgt cac tac tgc tac cct cat   |     |     |     | 1056 |
| Arg Ile Ser Thr Ala Ser Gly Asp Gly Arg His Tyr Cys Tyr Pro His   |     |     |     |      |
|   | 335 | 340 | 345 |      |
| ttc acc tgc gct gtg gac act gag aac atc cgc cgt gtg ttc aac gac   |     |     |     | 1104 |
| Phe Thr Cys Ala Val Asp Thr Glu Asn Ile Arg Arg Val Phe Asn Asp   |     |     |     |      |
|   | 350 | 355 | 360 |      |
| tgc cgt gac atc att cag cgc atg cac ctt cgt cag tac gag ctg ctc   |     |     |     | 1152 |
| Cys Arg Asp Ile Ile Gln Arg Met His Leu Arg Gln Tyr Glu Leu Leu   |     |     |     |      |
|   | 365 | 370 | 375 | 380  |
| taa gaagggaacc cccaaattta attaaagcct taagcacaat taattaaaag        |     |     |     | 1205 |
| tgaaacgtaa ttgtacaagc agttaatcac ccaccatagg gcatgattaa caaagcaacc |     |     |     | 1265 |

tttcccttcc cccgagtgat tttgcgaaac ccccttttcc cttcagcttg cttagatgtt 1325  
ccaaatttag aaagcttaag gcggcctaca gaaaaaggaa aaaaggccac aaaagttccc 1385  
tctcactttc agtaaaaaata aataaaacag cagcagcaaa caaataaaat gaaataaaag 1445  
aaacaaatga aataaatatt gtgttggtgca gcattaaaaa aaatcaaaat aaaaattaaa 1505  
tgtgagcaaa g 1516

<210> 2

<211> 21

<212> DNA

<213> Artificial Sequence

<223> PCR Primer

<400> 2

cagtggagat gggcgtcact a 21

<210> 3

<211> 21

<212> DNA

<213> Artificial Sequence

<223> PCR Primer

<400> 3

atgtcacggc agtcggtgaa c 21

<210> 4

<211> 25

<212> DNA

<213> Artificial Sequence

<223> PCR Probe

<400> 4

tgctaccctc atttcacctg cgctg 25

<210> 5

<211> 19

<212> DNA

<213> Artificial Sequence

<223> PCR Primer

<400> 5

gaaggtgaag gtcggagtc

19

<210> 6

<211> 20

<212> DNA

<213> Artificial Sequence

<223> PCR Primer

<400> 6

gaagatggtg atgggatttc

20

<210> 7

<211> 20

<212> DNA

<213> Artificial Sequence

<223> PCR Probe

<400> 7

caagcttccc gttctcagcc

20

<210> 8

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 8

tgccttctca ctgtctccat

20

<210> 9

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 9

ttgccttctc actgtctcca

20

<210> 10

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 10

gttgcttct cactgtctcc

20

<210> 11

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 11

ggttgcttc tcaactgtctc

20

<210> 12

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 12

tggttgctt ctcactgtct

20

<210> 13

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 13  
ctttggttgc cttctcactg 20

<210> 14  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 14  
gtgaaatgag ggtagcagta 20

<210> 15  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 15  
aggtgaaatg agggtagcag 20

<210> 16  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 16  
caggtgaaat gagggtagca 20

<210> 17  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 17  
gcaggtgaaa tgagggtagc 20

<210> 18  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 18  
cgcaggtgaa atgagggtag

20

<210> 19  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 19  
gcgcaggtga aatgagggtg

20

<210> 20  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 20  
agcgcaggtg aaatgagggt

20

<210> 21  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 21  
tggttctcagt gtccacagcg

20

<210> 22  
<211> 20



<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 22

atgttctcag tgtccacagc

20

<210> 23

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 23

gatgttctca gtgtccacag

20

<210> 24

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 24

cggcggatgt tctcagtgtc

20

<210> 25

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 25

acggcggatg ttctcagtgt

20

<210> 26

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 26

cacggcggat gttctcagt

20

<210> 27

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 27

acacggcgga tgttctcagt

20

<210> 28

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 28

acacacggcg gatgttctca

20

<210> 29

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 29

gaatgatgtc acggcagtcg

20

<210> 30

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 30  
tgaatgatgt cacggcagtc 20

<210> 31  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 31  
ctgaatgatg tcacggcagt 20

<210> 32  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 32  
gcgctgaatg atgtcacggc 20

<210> 33  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 33  
tgcgctgaat gatgtcacgg 20

<210> 34  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 34  
ggttcccttc ttagagcagc 20

<210> 35  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 35  
gggttcctt cttagagcag

20

<210> 36  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 36  
gtttcgaaa atcactcggg

20

<210> 37  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 37  
ggtttcgcaa aatcactcgg

20

<210> 38  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 38  
gggtttcgca aaatcactcg

20

<210> 39  
<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 39

tttggaacat ctaagcaagc

20

<210> 40

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 40

atttggaaca tctaagcaag

20

<210> 41

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 41

tgagagggaa cttttgtggc

20

<210> 42

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 42

gtgagaggga acttttgtgg

20

<210> 43

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 43

agtgagaggg aacttttgtg

20

<210> 44

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 44

actgaaagtg agaggggaact

20

<210> 45

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 45

tactgaaagt gagaggggaac

20

<210> 46

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 46

ttactgaaag tgagagggaa

20

<210> 47

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

&lt;400&gt; 47

ttttactgaa agtgagaggg

20

&lt;210&gt; 48

&lt;211&gt; 20

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;223&gt; Antisense Oligonucleotide

&lt;400&gt; 48

gctgctggtt tttttatttt

20

&lt;210&gt; 49

&lt;211&gt; 20

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;223&gt; Antisense Oligonucleotide

&lt;400&gt; 49

tgctgctggtt ttattttattt

20

&lt;210&gt; 50

&lt;211&gt; 20

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;223&gt; Antisense Oligonucleotide

&lt;400&gt; 50

ctgctgctgt tttattttatt

20

&lt;210&gt; 51

&lt;211&gt; 20

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;223&gt; Antisense Oligonucleotide

&lt;400&gt; 51

gctgctgctg ttttatttat

20

<210> 52  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 52  
tgctgctgct gttttattta

20

<210> 53  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 53  
ttgctgctgc tgttttattt

20

<210> 54  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 54  
tttgctgctg ctgttttatt

20

<210> 55  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 55  
gtttgctgct gctgttttat

20

<210> 56  
<211> 20



<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 56

tgtttgctgc tgctgtttta

20

<210> 57

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 57

ttgtttgctg ctgctgtttt

20

<210> 58

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 58

tttgtttgct gctgctgttt

20

<210> 59

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 59

atttgtttgc tgctgctggt

20

<210> 60

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 60

tatttgtttg ctgctgctgt

20

<210> 61

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 61

cattttattt gtttgctgct

20

<210> 62

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 62

tcattttatt tgtttgctgc

20

<210> 63

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 63

ttcattttat ttgtttgctg

20

<210> 64

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

&lt;400&gt; 64

tttcatttta ttgtttgct

20

&lt;210&gt; 65

&lt;211&gt; 20

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;223&gt; Antisense Oligonucleotide

&lt;400&gt; 65

tatttcattt ttttgtttg

20

&lt;210&gt; 66

&lt;211&gt; 20

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;223&gt; Antisense Oligonucleotide

&lt;400&gt; 66

ttatttcatt ttatttgttt

20

&lt;210&gt; 67

&lt;211&gt; 20

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;223&gt; Antisense Oligonucleotide

&lt;400&gt; 67

tttatttcatt tttatttggt

20

&lt;210&gt; 68

&lt;211&gt; 20

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;223&gt; Antisense Oligonucleotide

&lt;400&gt; 68

ttttatttca ttttatttgt

20

<210> 69  
<211> 20  
<212> DNA  
<213> Artificial Sequence  
  
<223> Antisense Oligonucleotide

<400> 69  
cttttatttc attttatttg

20

<210> 70  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 70  
tcctttattt cattttattt

20

<210> 71  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 71  
ttcttttatt tcattttatt

20

<210> 72  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 72  
tttcttttat ttcattttat

20

<210> 73  
<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 73

gtttctttta tttcatttta

20

<210> 74

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 74

tgtttctttt atttcatttt

20

<210> 75

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 75

ttgtttcttt tatttcattt

20

<210> 76

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 76

tttgtttctt ttatttcatt

20

<210> 77

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 77

catttggttc ttttatttca

20

<210> 78

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 78

tcatttggtt cttttatttc

20

<210> 79

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 79

ttcatttggt tcttttattt

20

<210> 80

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 80

tttcatttgt ttcttttatt

20

<210> 81

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 81  
atttcatttg tttcttttat 20

<210> 82  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 82  
tatttcattt gtttctttta 20

<210> 83  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 83  
ttatttcatt tgtttctttt 20

<210> 84  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 84  
tttatttcatt tggttctttt 20

<210> 85  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 85  
atttatttca tttgttcttt 20

<210> 86

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 86

tatttatttc atttgttct

20

<210> 87

<211> 20

<212> DNA

<213> Artificial Sequence

<223> Antisense Oligonucleotide

<400> 87

atatttatatt catttgtttc

20